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AUTHOR Howarth, Les; Wagner, James
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ABSTRACT

The hypothesis was tested that highly anxious students invited to employ reflective learning strategies would spontaneously use a more reflective, less impulsive approach in solving response-oriented problems. A total of 53 fourth-grade students were administered the Child Anxiety Scale: 12 students were assigned to a high-anxiety treatment group, while 16 served as low-anxiety controls. Anxiety was used as an indicator of the independent variable of impulsivity. The dependent variable, involving both response behavior and learning behavior measures, was determined on a pretest/treatment/posttest basis. Treatment basically consisted of (1) obtaining a baseline measure of the number of stimulus items subjects could recognize, extract from a random array, and order to match a previously seen set; (2) suggesting to subjects a labeling procedure that might improve performance; and (3) continuing the first procedure from baseline until progress could no longer be made. Importantly, no explicit strategy was outlined; subjects chose their own labeling strategy as well as the degree to which they utilized strategy. A measure of learning was taken during treatment administration. Main findings indicated that the higher order strategy adopted by both control and treatment groups resulted in more reflective behavior in learning tasks and also transferred to subjects' response behavior. (RH)

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A.E.R.A. PRESENTATION

ANNUAL CONFERENCE, APRIL 1983

AN INVITATIONAL APPROACH TO REDUCING ANXIETY IN THE LEARNING AND RESPONSE BEHAVIOUR OF CHILDREN

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by Les Howarth

and James Wagner

College of Education
Brock University
St. Catharines, Ontario

PS013541

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ABSTRACT

This study looked at the hypothesis that high anxious students who are invited to employ reflective learning strategies will spontaneously use a more reflective approach in problem solving response oriented tasks. This was predicted because an invitational approach to changes of this nature places the locus of control with the student and not the teacher/therapist. The results confirmed this hypothesis showing what is to the best of our knowledge for the first time, transfer of experimentally acquired reflective behavior from a learning to a problem solving task.

Two word descriptor: Reducing Anxiety

One of the major tenets of Invitational Education lies in the assertion that the learning process is ultimately under the control of the student or learner and that the educator or teacher who fails to take this point into account will be limited in the amount of learning he/she can affect. In this sense the concept of inviting the learner to learn goes beyond the procedure of providing positive reinforcement and a supportive environment for the learner. Like deCharms (1968), Purkey (1970,1978) argues that when learning is taking place, the locus of control must reside with the learner if what is being learned is going to be fully assimilated. Implied, is the notion that educators must seek ways of making the learner responsible for his/her own learning.

Within the context of this argument it is important to note that neither deCharms (1968) nor Purkey (1970, 1978) maintain that learning will not take place if the locus of control during learning is under the control of the teacher. Rather, what is being argued is that more learning and qualitatively higher learning will occur when the learner is in control of his/her own learning. The terms 'more learning' and 'qualitatively higher learning' need to be clarified, however. How for instance, would one operationalize these concepts?

One way of dealing with this problem may lie in the concept of transfer as it applies to learning behaviour. For example, it is not unreasonable to argue that if more learning is taking place, a greater amount of transfer may be expected in new related learning tasks. Similarly, qualitatively higher learning may result in a broader range of transfer in terms of new learning tasks. Implicit in this argument of course, is the assumption that qualitatively higher learning refers to the learning of

executive strategies which are general in nature and apply across task domains. In this respect a distinction can be made between the learning of lower level task specific executive strategies and higher level executive strategies which are less task specific (Anderson, 1982; Case, 1978). The term'higher level' of course, is a spatial mataphor which in this case, refers to executive strategies which can be applied across a broad range of tasks and which may be coded as general declarative knowledge within the learner's repetoire of learning routines (Anderson, 1982).

In order for learning and transfer of this nature to take place, however, Purkey (1970) argues that the learner must not only have control over the learning process but also, must see himself/herself as a capable learner. This follows from Purkey's description of the learner who actively invests in the learning process. If Wagner's (1982) analysis of the relationship between the concepts of investing (Purkey, 1978) and reflective abstraction (Piaget, 1976) is correct, the learner must be willing to analyze his/her errors and learning strategies and risk testing a new strategy on the basis of this analysis. Learner's who have failed to learn a given task, of course, are likely to have negative feelings about the task and over time, are likely to develop a low self-concept in relation to the task (Purkey, 1970; Shavelson and Bolus, 1982). These negative attributions in turn, are seen as inhibiting the willingness of the learner to invest in the process of constructing and testing a new learning strategy. In other words, the learner with a negative self-concept in relation to a particular task is characterized as a learner who may wish to avoid taking the responsibility of investing in the learning process.

This type of reaction may take the form of passiveness or it may be reflected in actual avoidance behaviour. Kagan (1966) for example, has argued that students with learning problems tend to be more anxious and impulsive in their response behaviour than normal students. The avoidance behavior then, can be observed in the learner's use of a global processing strategy which results in a fast, inaccurate response on certain tasks such as the Matching Familiar Figures Test (Kagan, 1966). Kagan (1966) and Meichenbaum and Arsarnow (1979) have also demonstrated that it is possible to change a learner's response strategy from one of fast inaccurate global processing to one of slower more accurate analytical processing. Of particular interest within the context of this paper is that their training procedure on the Matching Familiar Figures Test consisted of having the learner select a response and then in the case of an incorrect choice, verbally justify why each of the response alternatives in the problem was correct or incorrect. However, no feedback in terms of the correctness or incorrectness of the initial response was given. It is not unreasonable to hypothesize that the change in response strategy that was observed in these studies occurred because this procedure required the learner to analyze (a) the stimulus and (b) his/her response strategy. As Piaget (1976) has argued, both of these steps are a necessary part of the process of reflective abstraction. That the learner was then willing to select and test a new strategy on the next trial may have occurred because the procedure did not include feedback on the success or failure of each trial. In other words, apart from the verbal justification requirements, the locus of control for change in this procedure was primarily in the hands of the learner.

Unfortunately, one cannot be sure whether the changes in response time and accuracy observed by Kagan (1966) and Meichenbaum and Asarnow (1979) were the result of the reduction of anxiety in the learners, the learning of task specific strategies or both. Put another way, the application of the Meichenbaum and Asarnow (1979) verbal justification procedure to a single task such as the Matching Familiar Figures Test results in the confounding of training designed to invite the learner to identify a higher level general learning strategy, such as less impulsive analytical processing, and task specific learning strategies, such as the exhaustive feature matching required on this test. Thus, we cannot be sure if the high anxious impuslive children in the Kagan (1966) and Meichenbaum & Asarnow (1979) studies actually developed the higher order learning strategy of analytic processing that would be associated with the improvement of their self-concepts as learners.

With this in mind, we decided to test the hypothesis that a higher order learning strategy associated with an improved self-concept would transfer to new learning or problem solving tasks when the learner is invited to change his/her learning strategies. In order to do so, it was necessary to find two tasks which required different task specific learning and problem solving strategies but which nevertheless, also required the same higher order general learning strategy. For this reason we decided to employ a learning task in our treatment condition and a problem solving task to test for transfer. For example, it was reasoned that the verbal rehearsal strategy our subjects were instructed to employ on the visual sequential memory subtest of the Illinois Test of Psycholinguistic Abilities was quite different from the exhaustive feature matching strategy required

on the Matching Familiar Features Test we employed in the pre and posttest conditions. However, it is important to note that both of these tasks could be indexed in terms of impulsivity (i.e. spontaneous self-selected learning time and response time) and in terms of an improvement in performance. In other words, the same higher order learning strategy of less impulsive behaviour could be measured in both tasks.

The experiment itself was designed to measure the modification of impulsivity in two areas (1) the modification of learning behaviour (2) the transfer that occurs from learning behaviour to response behaviour. The first step was to identify a control group of reflective students and a treatment group of impulsive students. Since impulsivity has been linked to heightened anxiety levels (Sarason, 1960; Kauffman, 1981), a measure of anxiety was determined as an appropriate indicator of the independent variable of this experiment. Anxiety of this nature may manifest itself in avoidance behaviour. This avoidance may be subtly revealed as impulsive learning and response behaviour (Kagan, 1966). As a result, the student tends to do poorly in related problem solving situations which further complicates his perception of being unable to learn. The Child Anxiety Scale (Gillis, 1980) was administered to fifty-three grade four students in two schools in the City of St. Catharines, Ontario. From the scores attained and conversion tables supplied, twelve students were found to comprise the high anxious group while sixteen students formed the low anxious sector.

The dependent variable was determined on a pretest/treatment/posttest basis. It involved both response behaviour and learning behaviour measures. The response behaviour consisted of Kagan's Matching Familiar Figures Test as a pretest and posttest score. In addition, a measure of learning was taken during

the administration of the treatment. This was done with Kirk's (1976) Visual Sequential Memory Test of the Illinois Test of Psycholinguistic Abilities.

Procedures for Measurement of the Dependent Variable

Individual testing was conducted in a private area in the following manner:

Pretest Response Behaviour:

The subject was told that he/she would be shown a series of pictures of things that were recognizable. He/she was told that with each picture there would be six choices of which only one was identical. His/her job was to pick out the one of these choices that was exactly the same as the picture being shown. The subject then pointed to the response alternative which he/she felt was exactly the same. Six trials were attempted in the pretest. The two methods of evaluating responses by the subjects were (i) response time (the time taken from when the subject was shown the stimulus picture to the point of his/her selction), (ii) response accuracy (a correct or incorrect selection of the response alternatives).

Strategic Learning Behaviour:

Upon completion of the pretest measure of Kagan's MFF test, subjects were instructed that they would then be shown some plastic tiles with designs on them that were not quite as easy to recognize. The experimenter then spread the tiles on the table in front of the subject. Two tiles were randomly selected by the experimenter and placed on a rubber pad in front of the subject. The experimenter said to the subject, "Now, I want you to look at the two tiles immediately in front of you. When you think you know which two they are and in what order they are in, I want you to tell me. Then I am going to mix them in with the other tiles and have you choose which two were on the pad and in what order they were placed." Following this, the number of tiles placed on the rubber pad for examination was singularly increased until the subject erred in either his/her response item or order selection. At this point his baseline was established (determined by the highest number of tiles which he has successfully recalled). Following the establishment of a baseline, the experimenter interjects, "It may be easier to remember which tiles were there and in what order if

you can name them. Now, what do you think this tile looks like?" (Experimenter points to one of the tiles on the pad - subject responds). "And this one?" (Experimenter designates a different tile), etc. After the subject has gained some familiarity with this labelling procedure, the subject is instructed in a means of verbal rehearsal which may facilitate the appropriate selection of tiles. In demonstration, the experimenter covers the tiles and looks away, finger counts and suggests that perhaps even saying their order aloud may assist in solution of this problem. Working from the baseline, three trials at each successive level are attempted. The subject advances to the highest level possible until he/she errs on two of three, or three of three trials at a given level. At this point the learning behaviour testing would cease. The degree in which the subject employs the strategies (covert or overt) is entirely their choice. Rehearsal time taken and recall accuracy are measured with respect to the correct placement of tiles.

Posttest Response Behaviour:

Exactly the same procedure is followed in the posttest measurement as in the pretest measurement of responses. The six remaining trials are similarly examined for response time and accuracy.

At this point, consider the method of introducing the required learning strategy to the subjects. First, the experimenter merely suggested or offered an invitation about how one's problem solving could be enhanced. There was neither an explicit strategy outlined nor a specific manner of conducting the strategy. In support of Combs et al. (1976) notion that optimum learning will occur if a learner can readily and personally identify with the material to be learned, this procedure was intentionally followed. The subjects chose their own labelling strategy as well as the degree to which they chose to utilize this strategy. The manner in which one student would visualize, label and rehearse the design on a plastic tile was not necessarily consistent with how the other students would do so.

Second, one would expect that the degree of training a subject engaged in would influence his/her success in the learning condition.

Hence, an increase in terms of recall accuracy and rehearsal time might be expected during the treatment part of the experiment. However, there was no reason to expect that the formation of a strategy which would improve an individual's learning behaviour would necessarily apply to his response behaviour. The two tests used in the experiment (the MFF and Visual Sequential Memory Test) also represent different types of stimuli. The MFF test is a match-to-sample task with the stimulus comprised of separable attributes. On the other hand, the stimuli for the Visual Sequential Memory Test are made up of integral attributes. Sternberg and Rifkin (1979) have determined that both processes are subject to different cognitive mechanisms. The formation of a strategy (e.g. the appropriate use of verbal labelling and rehearsal) which would improve an individual's learning behaviour would not necessarily apply to response behaviour. However, a transfer of direct strategy use for the two separate measures is not expected. It is the manner of instituting a strategy that the co-existent indirect reflective quality as evidenced by the learning condition that was expected to the subjects response behaviour. For example, the direct rehearsal and self-testing strategic trained behaviour of subjects in the learning condition maintains an inherent slower and analytic verbal mediation strategy. The complete item feature analysis on the MFF test required for reflective response behaviour is also characteristic of an indirect slower and analytic behaviour.

In anlaysing the data attained, a two factor (high anxious/low anxious)x two factor (rehearsal time/recall accuracy) ANOVA was performed for the learning condition. A two factor (high anxious/low anxious) x two factor (response time/response accuracy) ANOVA was carried out to measure response behaviour. Significant changes are listed in the table

below. The training procedures had significantly improved performance of the high anxious subjects ($p < .005$ - rehearsal time and $p < .005$ - recall accuracy) and for the low anxious subjects ($p < .05$ rehearsal time and $p < .001$ recall accuracy). As a measure of transfer from the learning to the response condition, posttest results were significantly improved for the high anxious subjects with respect to response time ($p < .025$) and for the low anxious subjects in both response time ($p < .025$) and response accuracy ($p < .005$).

SIGNIFICANT CHANGES OF HIGH AND LOW ANXIOUS SUBJECTS

		High Anxious	Low Anxious
Pretest (Response Behaviour)			
Training (Learning Behaviour)	Rehearsal Time	.005 / .001*	.05 / .005*
Baseline	Recall Accuracy	.005	.001
↓ Maximum Level			
Posttest (Response Behaviour)	Response Time	.025	.025
	Response Accuracy	n.s.	.005

* refers to the derived value following the application of a log transformation.

In essence, the higher order strategy adopted by both the control group and treatment group resulted in more reflective behaviour in learning tasks and also transferred to their response behaviour. The task specific strategy on the other hand, was designed to improve learning and was not directly applicable to a response condition. This researcher accounts for these findings on the basis of the difference between higher order executive strategies which are used to determine strategy use and lower order task specific strategies. The agent for making the improvement had shifted from the experimenter to the subject. It was the student, himself/herself, who decided what strategy to use and how he/she would incorporate it. The result was that even impulsive students could be trained to respond more slowly and accurately and generalize this trainin, to similar(although not identical) academic tasks with respect to response latency.

Two additional results should be reported. Although recall accuracy for the high anxious students improved in the treatment condition, these students did not demonstrate a similar increase in the response accuracy on the MFF posttest. This is not surprising given that the strategies required were not identical, and that other research (Kagan, 1977) has also found response time as being more modifiable than response accuracy. In addition, the observation that the high anxious control group showed significant improvement and transfer, suggests that this group may not have reached their developmental ceilings of impulsivity. Hence the treatment also modified their impulsivity.

The fact that anxiety related behaviour, as determined here and elsewhere (Murphy, 1980), can be modified, is encouraging to the classroom teacher. Specific remediation techniques, such as the invitational approach

used in this experiment may not only reduce anxious related reactions, but also improve the quality of response. Impulsivity was readily modified through a basic inviting approach to learning (Purkey, 1970). The subjects were successful, which bolstered their confidence and led to further success on the academic tasks. An appropriately trained learning strategy as such has an immediate positive influence on performance and encourages strategy retention and maintenance over time (Engel et al., 1980).

This represents a highly individual approach to learning. In the present era of specialized fields of instruction and individual programming, the findings of the present experiment take on increased importance.

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